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An
Inaugural Essay
on
Wounds of the Articulations.

For the degree of Doctor of Medicine
in the University of Pennsylvania. -
P. by

Hughart S. Montgomery
of
Virginia.

Commune quod est, ne tamen solund dicas.

Philadelphia

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To one, not acquainted with the fact, it may appear somewhat strange, that in the records of Surgery there is scarcely to be found a satisfactory treatise on wounds of the joints.

Few authors have touched upon the subject, and those few in a manner so cursory, as to leave our knowledge of those accidents, quite limited. — Whether their silence be owing to the extreme simplicity of their treatment, not differing in any degree from wounds in other parts; or to their occasional immediate and unexpected fatality, not admitting of practical investigation, I shall not take upon my self to determine. Perhaps a more palpable reason may be found in the melancholy fact, that there is no portion of the human dissection more grossly neglected by the student of Anatomy, or less generally understood by the young practitioner of surgery, than the structure and vital habitudes of the articulations, —

is most important with the fact that
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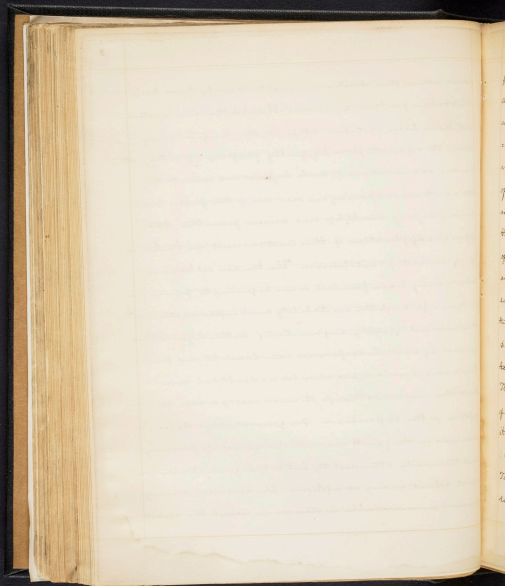
A wound of a joint, may be defined a division or penetration of the capsular ligament. In addition to the opening in the capsule there is frequently a lesion of the lateral ligaments, cartilages, and bones. There are many varieties of these accidents, caused by puncturing, incising and contusing instruments, or indeed by any mechanical violence. The symptoms attendant on

the milder forms of these injuries are not peculiar; but such as accompany any simple wound, as pain increased heat of the part, redness, tumefaction and more or less extravasation or effusion. The more aggravated symptoms we will mention when treating of complicated wounds of the joints.

The surgeon is generally enabled to determine whether the cavity of the joint be injured or not by the direction of the wound, and by the discharge of synovia. It is possible for him however to be mistaken in this fluid as it very much resembles that discharged from the bursae mucosae and sheaths of tendons. Boyer relates several

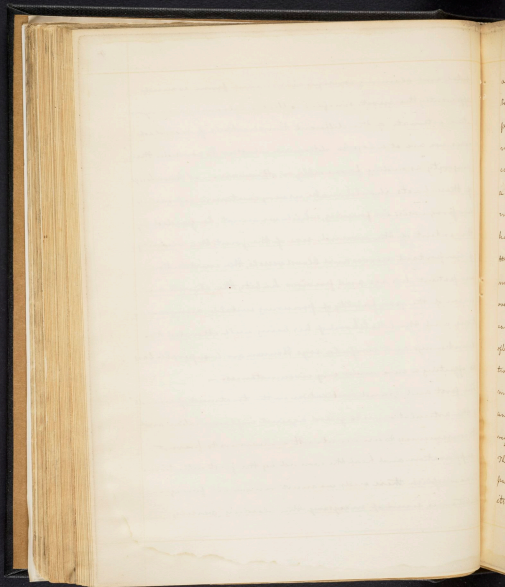
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cases when this discharge might readily have been mistaken for true synovia. Should this circumstance not have been noticed at first, the surgeon may cause it again to flow by gently pressing upon the part. In our examinations of such injuries we cannot be too cautious or sparing in our use of the probe. Much serious injury doubtless has arisen from the too officious application of this instrument in the hands of ignorant practitioners. The tender adhesions which may have formed or are beginning to form are broken up, and the irritability and inflammation of the wound greatly augmented. As the information gained by such interference can lead to no formal conclusion, we should in doubtful cases treat the wound as though it were really a case of rupture of the capsule. — In general, says Boyer wounds of the joints are not dangerous if properly and timely attended to; but to this general rule we must admit many exceptions. The records of surgery furnish innumerable instances in which the most

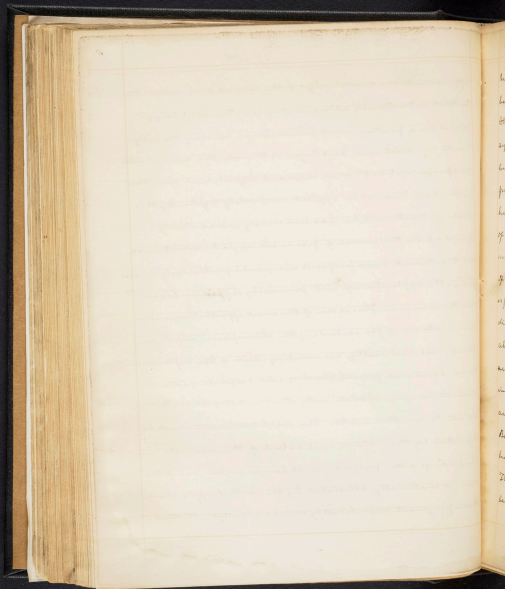


fatal and alarming consequences issued from wounds apparently the most simple, so that in drawing a comparative estimate of the different terminations of recorded cases, we are at a loss to determine whether to consider the majority as ending favourably or otherwise. A knowledge of these facts, should make us very cautious in expressing our prognosis: in forming which we must be guided by the extent of the wound, size of the joint, the vicinity of important nerves and blood vessels, the constitution of our patient, his age and previous habits, the climate and season of the year, facility of procuring suitable accommodations, and the likelihood of his being well attended to. Scurvy and scrofula says Boerhaave are insuperable bars to effecting a cure under any circumstances. -

The first and grand indication in the treatment of wounds of the articulations, is to guard against inflammation and its consequences; to use our utmost endeavours to prevent suppuration, and heal the wound by the first intention. To accomplish these ends, we must remove all foreign substances, secure of reassembling the bleeding vessels,



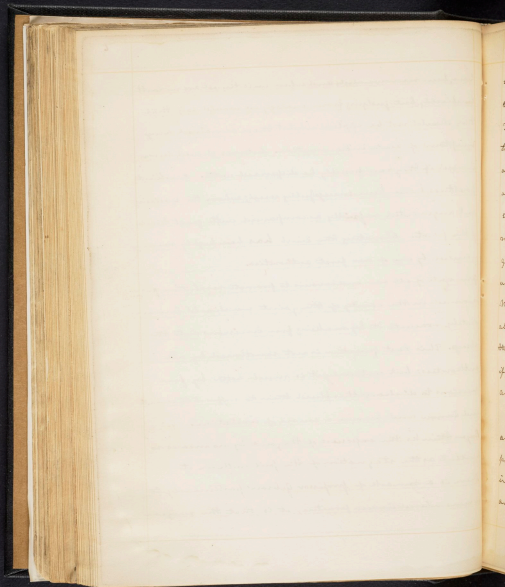
approximate the divided edges of the wound and retain them in that situation by adhesive strips. The limb being placed in a position most favourable for relaxing the integuments, our next care, says Boyer, is to cover the wound with compresses wet with some resorbet liquid, and over these a bandage should be applied moderately tight. By this mode of treatment he has seen many cases entirely healed up in the course of five or six days. In addition to the treatment here proposed we would particularly recommend the application of lint previously dipped in blood over the wound. This is one of the most effectual means we can make use of for excluding the atmosphere, which so often proves, indirectly, an exciting cause of the inflammation. Local and general bleeding, cold evaporating lotions, moderate fomenting, absolute rest, strict antiphlogistic regimen, are all to be attended to. The local treatment must be regulated by the nature and extent of the wound. — The feelings of the patient must be consulted, and if the pain be materially alleviated by this or that application, its employment will hardly ever be wrong. Blisters



have been recommended, and when well-timed are no doubt beneficial, but judging from analogy we would say, that they should not be applied whilst there remained any symptoms of acute inflammation. Leeches should never be used if they can possibly be dispensed with. Excellent poultices have been successfully used; when the swelling had augmented rapidly accompanied with great tension of the part. Elevating the limb has been highly recommended by one of our first authorities.

If in spite of all our endeavours to promote resolution, pus is formed in the cavity of the joint, we should immediately evacuate it by making free incisions into the abscess. This last practice is not sanctioned by all authorities; but certainly it is much better by free incisions to discharge the fluid, than to suffer it to remain and burrow and become a source of irritation.

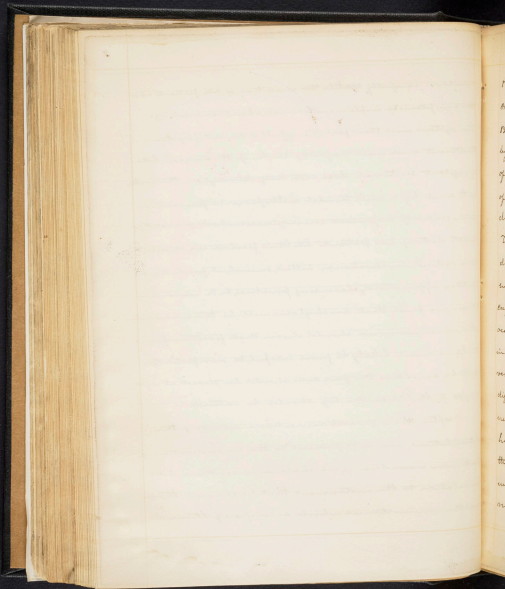
Boyer thinks the exposure of the joint by no means so hurtful as the stagnation of the pus within it. There is a remark of professor Gibson particularly to be remembered in our practice, it is, that the surgeon



should, he carefully watch the condition of his patient when the symptoms of inflammation are about subsiding. The system will then feel the effects of the antiphlogistic treatment and will rapidly sink, if the surgeon like a vigilant sentinel does not keep always on the look out and by a well timed interference prevent a succession of injurious consequences, which of necessity must destroy his patient. At this period we should give old wine, cinchona, bitters, succulent food, stimulating applications, cleansing poultices, &c. &c. ————

When we find that anchylosis will be the unavoidable consequence, we should choose that position for the limb most likely to prove useful to our patient, if it be an elbow the fore arm should be placed at right angles if the knee, the leg should be extended.

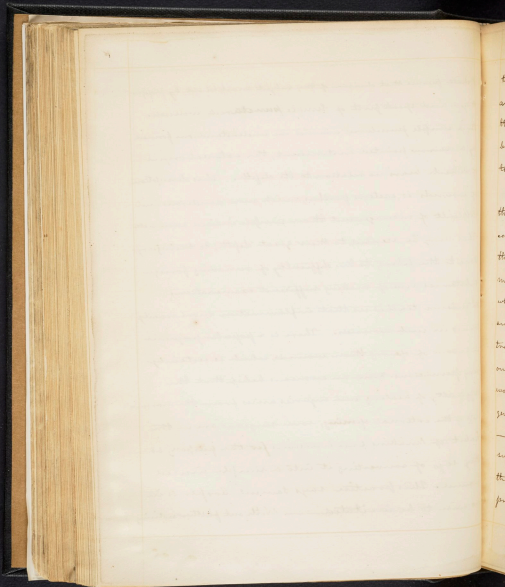
After these general remarks on wounds of the articulations, we will proceed to the consideration of particular wounds, and we shall consider them, both in relation to the instrument that has formed them and the circumstances which accompany them



I shall pursue that division of the subject marked out by professor Boyer, and speak first of simple punctured wounds.

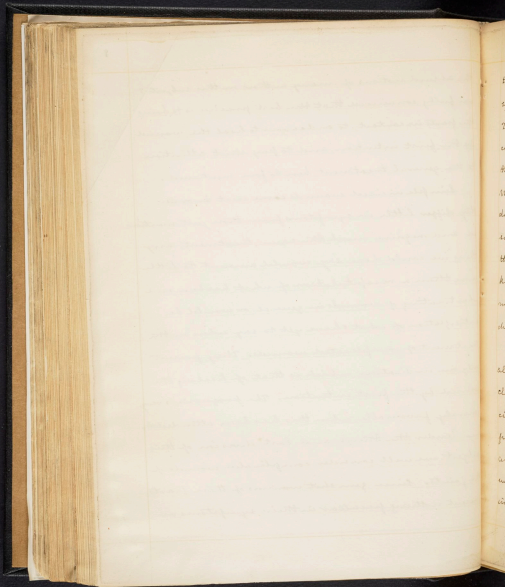
By a simple punctured wound we understand, one formed by a narrow pointed instrument, the external orifice of which bears no relation to its depth. This description of wounds is, *ceteris paribus*, much more dangerous and difficult of management than simple incised wounds. This may be ascribed to their great depth; to the injury done to the fibres; to the difficulty of removing foreign substances and of making sufficient examination.

Experience teaches us that inflammation more readily occurs in such wounds. There is a popular prejudice in favour of opening these wounds, which is certainly very pernicious. From an erroneous belief that the difficulty of healing such injuries, arises from the narrowness of the external opening, some surgeons are in the habit of making free incisions for the purpose, as they say, of converting it into a simple incised wound. This practice says Samuel Cooper is in no wise to be imitated — Without farther noticing



the absurd notions of many authors on this subject? I am fully convinced that the best practice is to bring the parts in contact, to endeavour to heal the wound by the first intention, and to pay strict attention to the general treatment here to four mentioned.

Simple incised wounds come next in order, they differ little in symptoms from those just mentioned, and require much the same treatment, any thing we could here say would amount to little more than a recapitulation of what has been said when treating of wounds in general, or would be anticipation of what I have yet to say when on the treatment of complicated wounds. They present only one indication, which is that of healing the wound by the first intention. The prognosis is very generally favourable when this has been attended to — Under the third and last division of this subject we will consider complicated wounds of the joints. Since gun shot wounds of these parts present nothing peculiar in their symptoms or



treatment I shall no farther consider them as a distinct species, than by retaining their appropriate name. They may I think be naturally enough considered as complicated or simple contused wounds according to the nature of the accident.

We have a bare hinted that wounds of the articulations do not always terminate favourably, and that however simple they may be in their commencement, yet if the patient's constitution be not good, or he does not keep the part perfectly at rest, serious consequences may arise and the unfortunate suffers immediately, perish or be saved only by amputation.

When we consider says Boyer, that almost all wounds of the joints, that have been immediately closed and in which there is no particular circumstances to prevent adhesion, unite by the first intention, and that in cases where wounds are not closed the most serious symptoms follow, we cannot avoid attributing these consequences to the impression of air on the internal face of synovial

membrane, and to the cartilages and fatty matter within the joint. We know by experience continues the same author, that the action of air on parts not naturally accustomed to its influence and especially serous membranes is to excite inflammation. In the next sentence he says that air cannot be considered as the only cause of inflammation of joints that are wounded, for it often succeeds to wounds so narrow and oblique that this fluid cannot enter, in other cases inflammation occurs too suddenly to have been produced by its influence. He is persuaded that wounds of the cartilages and bones, improper dressings, errors in regimen, morbid condition of the patient, may all contribute to the origin of inflammation, and perhaps it may arise from one of the above mentioned causes exclusively.

Little experience is necessary to convince any one that the views taken by this author of this subject are incorrect. As regards his idea of air always proving

the cause of irritation and inflammation when applied to surfaces not accustomed to its influence, this is an opinion long since exploded, as may be shown by the experiments of Dr. Physick and others.

Besides do we not daily see joints amputated and the synovial membrane exposed for a considerable length of time in contact with this fluid, and yet no bad consequences result. I cannot see the applicability of his second remark to the case in question. —

That air cannot be always considered as the cause of inflammation in wounded joints is now admitted. Inflammation of a very serious character may, and often does occur in joints that have never been wounded or mechanically injured in any way —

Besides we cannot concur in the belief that inflammation ever arises from wounds of the cartilages. These substances owing to their want of vascularity forever resist the inflammatory process. Cartilages it is true may be absorbed, and the heads of the bones thus brought in contact may cause inflammation, but

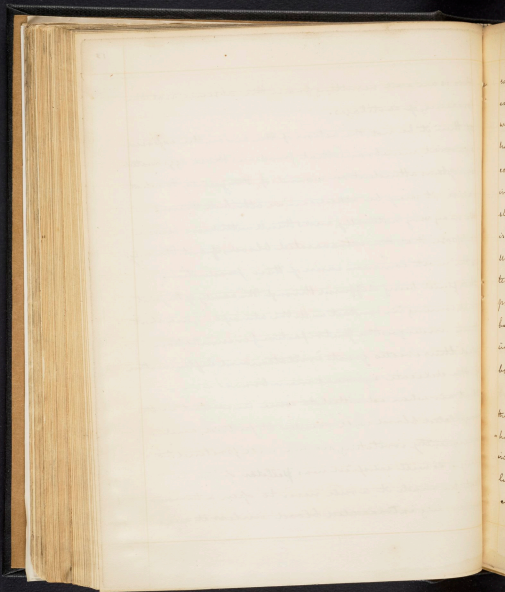
This is an evil resulting from the absence, not the presence, of cartilages.

If then it be not the action of the air on the exposed synovial membrane that produces those aggravated symptoms attendant on wounds of the joints, to what cause it may be asked, can we attribute them? —

We may very naturally, and I think with more reason suppose that the extravasated blood, if not the only, is the most common cause of their production.

This fluid being diffused through the cavity of the joint and coming in contact with the atmosphere, in a short time undergoes the putrid fermentation, and thus creates great irritation and inflammation of the delicate synovial membrane. — — — —

That air when admitted to come in contact with coagulated blood will render it putrid and consequently irritating, no one will pretend to deny. So well satisfied was Pelletan of this fact that he made it a rule never to open a tumour containing extravasated blood unless it was



so situated that it could be entirely removed. If the air be excluded from such blood it will remain unaltered for weeks or until it is absorbed. Should the integuments however be divided and air admitted into the cavity containing blood, it will soon putrify and become irritating, producing inflammation and the most extensive sloughing— This view so far as I am enabled to learn is the original suggestion of Dr Thomas Harris of the United States' navy; who had ample opportunity of testing its veracity during our late wars. When the precaution of closing the external wound had not been observed or the effused blood suffered to remain in the joint, he almost invariably found the symptoms both constitutional and local greatly aggravated.

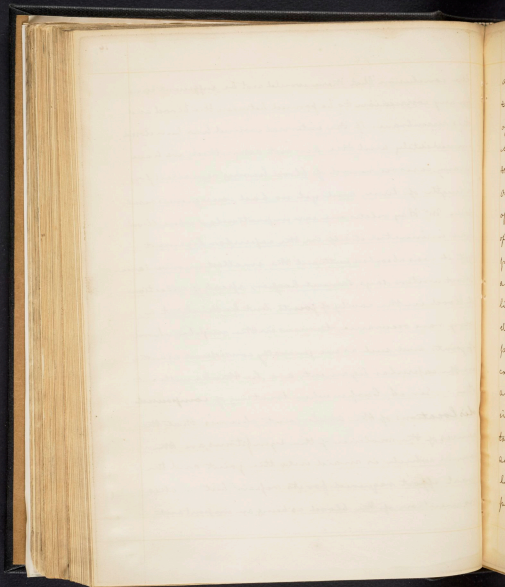
Dr Willson when treating of wounds of the joints, makes the following observation, "Experience has proved that should much blood be extravasated into the cavity of a joint, it will either lose its living principle and then irritate like any other extraneous substance, or by becoming vascular, it

will destroy the smoothness of the synovial membrane to which it is united, and thus produce ankylosis.

Although it may appear presumptuous to differ from so high authority, yet I cannot concur with the Br entirely. His idea of the blood losing its vitality is correct, but that it ever becomes vascular in the joints, is an error to which few pathologists of the present day will yield their assent.

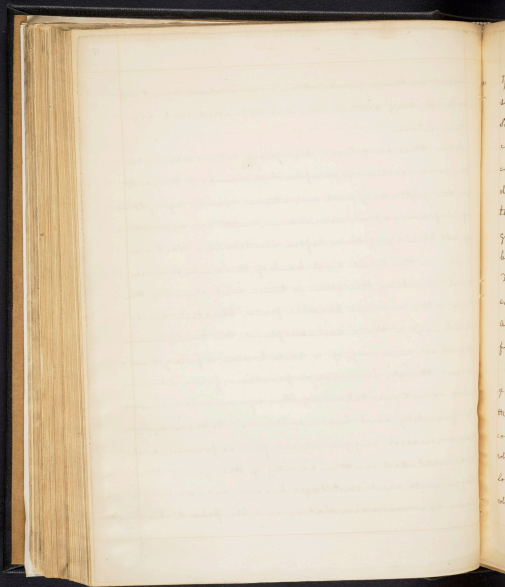
I am disposed to think indeed that had it not been for his great partiality for the opinions of Bro Hunter his own experience would have taught him that the reverse was true. I cannot believe that the blood becomes vascular in the cavity of joints, or adheres to the synovial membrane. This membrane may from inflammation throw out coagulable lymph, and thus become thickened and rough; but from the natural secretion which lubricates its surface, and the almost immediate putrefactive fermentation which takes place when the air has not been excluded, I am led to

the conclusion that there would not be sufficient time for any connexion to be formed between the blood and this membrane. If the external wound has been closed immediately and the air not admitted, we have many cases on record of blood having remained for a length of time, and yet no bad consequences resulted. Mr. H. J. relates one case in particular where blood had incriminated itself in the capsular ligament yet, it was absorbed without the smallest inconvenience. Most writers say, Samuel Cooper, speak of collections of blood in the cavity of joints, but he thinks it a very rare occurrence, tumours in the neighbourhood of joints and such as are generally considered as within the capsular ligament, are, he thinks, without it— Sir A. Cooper when treating of compound dislocations of the ankle joint observes: that the causes of the violence of the symptoms, are the wound which is made into the joint and the great effort required for its repair but makes no mention of the blood as being an important



agent in their production. Nor indeed am I able to find any author who has expressed such an opinion.

After this exegetical digression let us return to the consideration of complicated wounds of the joints. On the fifth day and sometimes sooner symptoms of inflammation commence, with an aggravation of all the symptoms before mentioned. We have pain in the head and back of the neck, nausea and vomiting, the skin is tense and shining, the lips of the wound become pale, bloated, and discharge a thin sanious fluid, the tongue becomes parched and dry, of a dark brown, or pale yellow colour, thirst, hurried respiration, fever, delirium, and sometimes tetanus; the synovia is increased in quantity and becomes thin. To these symptoms succeed suppuration, pus is formed, and accumulated in the cavity of the joint; the ligaments and cartilages become relaxed, pain becomes excruciating and the patient dies

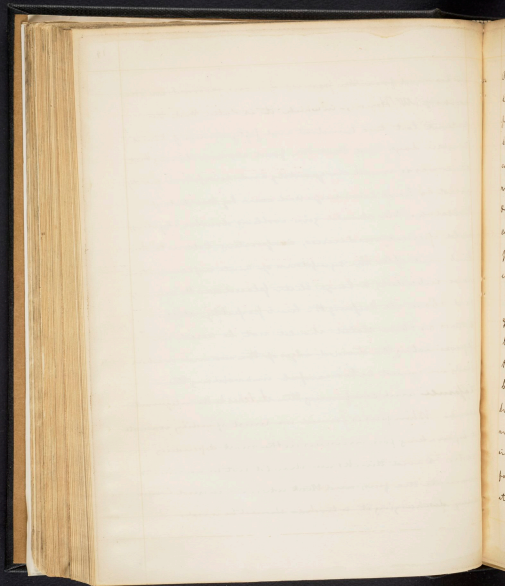


If the constitution be able to weather out the first symptoms, it then assumes a chronic form. Suppuration daily increases, symptoms of hectic come on, colliquative diarrhoea, fineness of countenance, and ultimate exhaustion, which destroys the patient unless saved by timely amputation. — It sometimes happens that these symptoms gradually subside and a cure is brought about but with ankylosis. Not unfrequently says Dr Thomson there is an erythematous swelling enveloping the whole limb and preventing amputation in cases where it seemed necessary for the preservation of the individual.

In the treatment of complicated wounds of the joints, the most vigorous measures are to be adopted for the relief of the patient. The great indication is to combat inflammation and prevent suppuration, which should be fulfilled by drawing blood freely, both locally and generally. Some idea of the extent to which blood letting may be, or has been carried, may

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be learned from the journal of a case recorded in the works of Mr. Hennen, in which it is stated that the patient lost two hundred and fifty ounces of blood in seven days, and that the food allowed during that time, was so small in quantity and simple in quality, as not to have been surpassed even by the diet of Valsalva. We should give cooling drinks, elysters, mild opiate medicines, ~~ex~~ evaporating lotions to the limb, and after the symptoms of acute inflammation have subsided, a large blister placed over the wound and above all keeping the limb perfectly still. Litters, as above stated should not be used in approximating the divided edges of the wound or when used, we cannot be too careful in avoiding them. ~~te~~ ^{ap}applied and confining the stitches to the integuments alone. When pus is formed we must speedily evacuate it by making fine incisions in the most depending parts. David thinks we should not be anxious to evacuate the pus, and that when we cannot longer delay discharging it, a trochar should be used.



Petit and Boyer are of a different opinion; they recommend large incisions to be made and all foreign matter carefully washed out, the effused blood must particularly be removed. In our opinion, says Boyer, when an abscess of a joint has resulted directly from inflammation produced by a wound of the capsule, contusion &c we should open it as soon as fluctuation is perceived, and make the incision large enough to waste out the pus. At this period emollient poultices may be used with advantage, in order to cleanse the wound.

Inflammation having subsided we must give a generous diet, such as wine, porter and bark. As an external application at this period Boyer recommends a decoction of cinchona and brandy. Gun shot wounds cannot be healed by the first intention, but must necessarily suppurate. Our first indication in the treatment of such injuries is, to search for the extraneous body and endeavour to remove it, as it cannot fail to produce serious evils;

for however harmless a ball may be whilst lodged in a muscular part, or amongst cellular membrane, in the cavity of a joint it cannot fail to excite the most violent symptoms. If the ball cannot be felt by the probe or if it be firmly imbedded in the head of the bone, so as not to be moved without considerable force, we shall let suffer it to remain, in hopes that suppuration may bring it away. In the meantime cleansing poultices are to be applied and inflammatory symptoms kept under. The practice of stuffing the wound with lint is to be condemned. The last importance is to be attached to elevating the limb and keeping it perfectly still.

Surgeons are not agreed as to the propriety of amputation in wounds of the joints; nor indeed can there be any definite rule laid down; we must in all cases be governed by the violence of the symptoms, heat of the weather, constitution of our patient, and extent of the injury done.

There can be little doubt of the propriety of amputation when the wound is extensive and the principal blood vessels are ruptured. and the sooner the better.

But upon the whole it is difficult to decide on the propriety or impropriety of the operation. Cases are recorded where the knee has been thrown at right angle completely, with the thigh and yet a cure was readily accomplished. Operations have been determined on, but prevented by some accident, and during the delay, the patient has recovered.

We must indeed leave it to the good judgment and previous experience of the practitioner. — — — —

Since writing the above, I have read in one of the New York journals a short treatise on wounds of the joints by Doctor Brown, he appears to disapprove almost entirely of blood letting in the treatment of these injuries.

As I am not convinced, by any arguments he has adduced, of the impropriety of the treatment here recommended, I shall make no alterations or amendments. We do not, more than Dr Brown, wish to see our patients destroyed by the depleting plan of treatment. We approve highly of all the local applications recommended by that gentleman, but cannot think it safe to dispense with the lancet. It is certainly the Hemlock remedy in all such injuries



